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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,346	09/24/2003	Mohammad Jaber Borran	873.0119.U1(US)	7074
29683	7590	01/05/2005	EXAMINER	
HARRINGTON & SMITH, LLP 4 RESEARCH DRIVE SHELTON, CT 06484-6212			BURD, KEVIN MICHAEL	
			ART UNIT	PAPER NUMBER
			2631	

DATE MAILED: 01/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,346

Applicant(s)

BORRAN ET AL.

Examiner

Kevin M. Burd

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

1. The information disclosure statement (IDS) submitted on 9/24/2003 is being considered by the examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8, 12, 13, 23-28 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Jafarkhani et al (US 2001/0031019).

Regarding claims 1, 13, 23 and 28, Jafarkhani disclosed a multiple input multiple output communication system as shown in figures 1 and 2. The system communicates using symbols that are mapped via space-time block code onto constellation points and are transmitted over n transmitting antennas (paragraph 0012). Each of the constellation points lie on a k -dimensional transmit circle (paragraph 0028). The dimensions are real dimensions (paragraphs 0009, 0050 and claim 9). Each of the antennas will transmit a constellation thus increasing the number of dimensions by the number of antennas.

Regarding claim 2, each of the antennas will transmit a constellation thus increasing the number of dimensions by the number of antennas.

Regarding claim 3, figure 1 shows n can be any value greater than 1.

Regarding claims 4 and 25, the parallel antennas will transmit separate constellations parallel to one another.

Regarding claims 5-8, 26 and 27, each of the constellation points lie on a k-dimensional transmit circle (paragraph 0028) and the antennas transmit the same information.

Regarding claim 12, the points of the constellations are formed in the compute symbols 15 component of the transmitter in figure 1.

Regarding claim 24, the network comprises a base and mobile station as shown in figures 1 and 2.

Regarding claim 32, the signal-to-noise is computed and helps to determine the signal constellations to be transmitted (paragraph 0011).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 9, 10, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 2001/0031019) in view of Lo (US 2003/0123877).

Regarding claims 9 and 29, Jafarkhani discloses the system described in paragraph 2. Jafarkhani does not disclose the constellations to be transmitted are

spherical constellations. Lo discloses the use of spherical constellations to transmit data as shown in figures 4A to 4D and in paragraphs 0030 to 0032. It would have been obvious for one of ordinary skill in the art at the time of the invention to transmit the constellations of Jafarkhani using spherical constellations since it would increase spectral efficiency for data carrying capacity (paragraph 0028).

Regarding claims 10 and 30, the spheres are concentric (paragraph 0032).

4. Claims 11, 14, 15, 17-22 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 2001/0031019) in view of Falzon et al (US 2003/0210824).

Regarding claims 11 and 31, Jafarkhani discloses the system described in paragraph 2. Jafarkhani does not disclose the distance between the points is defined by a Kullback-Leibler distance. Falzon discloses a system for compressing data for transmission (abstract) utilizing the Kullback-Leibler distance. It would have been obvious for one of ordinary skill in the art at the time of the invention to utilize the method of minimizing the Kullback-Leibler distance as taught by Falzon in the system of transmitting information of Jafarkhani. Falzon states "minimization of the Kullback-Leibler distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost coding in accordance with information theory (paragraph 0024).

Regarding claims 14 and 17-22, Jafarkhani discloses the system described in paragraph 2. In addition, each of the constellation points lie on a k-dimensional transmit

circle (paragraph 0028) and the antennas transmit the same information. Jafarkhani does not disclose the distance between the points is defined by a Kullback-Leibler distance. Falzon discloses a system for compressing data for transmission (abstract) utilizing the Kullback-Leibler distance. It would have been obvious for one of ordinary skill in the art at the time of the invention to utilize the method of minimizing the Kullback-Leibler distance as taught by Falzon in the system of transmitting information of Jafarkhani. Falzon states "minimization of the Kullback-Leibler distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost coding in accordance with information theory (paragraph 0024).

Regarding claim 15, each of the constellation points lie on a k-dimensional transmit circle (paragraph 0028).

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 2001/0031019) in view of Falzon et al (US 2003/0210824) further in view of Lo (US 2003/0123877).

Regarding claim 16, the combination of Jafarkhani and Falzon discloses the system described in paragraph 4. The combination does not disclose the constellations to be transmitted are spherical constellations. Lo discloses the use of spherical constellations to transmit data as shown in figures 4A to 4D and in paragraphs 0030 to 0032. It would have been obvious for one of ordinary skill in the art at the time of the invention to transmit the constellations of the combination of Jafarkhani and Falzon

using spherical constellations since it would increase spectral efficiency for data carrying capacity (paragraph 0028).

Conclusion

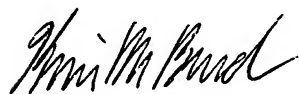
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cole (US 4,891,823) provides additional information regarding real vectors creating real constellations in column 1, lines 13-41.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Thursday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Burd

1/1/2005

KEVIN BURD
PRIMARY EXAMINER